

# REQUEST FOR ACCESS OF ABANDONED APPLICATION UNDER 37 CFR 1.14(a)

In re Application of

Harari et al

Application Number

337566

Filed

4-13-89

Group Art Unit

Examiner

Assistant Commissioner for Patents  
Washington, DC 20231

Paper No. #20

I hereby request access under 37 CFR 1.14(a)(3)(iv) to the application file record of the above-identified ABANDONED application, which is: (CHECK ONE)

\_\_\_ (A) referred to in United States Patent Number 5297148, column \_\_\_.

\_\_\_ (B) referred to in an application that is open to public inspection as set forth in 37 CFR 1.11, i.e., Application No. \_\_\_\_\_, filed \_\_\_\_\_, on page \_\_\_\_\_ of paper number \_\_\_\_\_.

\_\_\_ (C) an application that claims the benefit of the filing date of an application that is open to public inspection, i.e., Application No. \_\_\_\_\_, filed \_\_\_\_\_, or

\_\_\_ (D) an application in which the applicant has filed an authorization to lay open the complete application to the public.

Please direct any correspondence concerning this request to the following address:

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

Cindy Hilliard

Signature

8-19-97

Date

Cindy Hilliard

Typed or printed name

FOR PTO USE ONLY

Approved by: TS

(Initials)

Unit: F.I.U.

# United States Patent [19]

Harari et al.

US005297148A

[11] Patent Number: 5,297,148

[45] Date of Patent: Mar. 22, 1994

## [54] FLASH EEPROM SYSTEM

[75] Inventors: Elyahou Harari, Los Gatos; Robert D. Norman, San Jose; Sanjay Mehrotra, Milpitas, all of Calif.

[73] Assignee: SunDisk Corporation, Santa Clara, Calif.

[21] Appl. No.: 963,838

[22] Filed: Oct. 20, 1992

### Related U.S. Application Data

[62] Division of Ser. No. 337,566, Apr. 13, 1989, abandoned.

[51] Int. Cl.<sup>5</sup> ..... G06F 11/00

[52] U.S. Cl. .... 371/10.2; 371/10.1; 371/10.3; 365/200

[58] Field of Search ..... 371/10.2, 10.1, 10.3, 371/40.1; 365/200

### [56] References Cited

#### U.S. PATENT DOCUMENTS

4,601,031	7/1986	Walker et al. ....	371/10.3
4,612,640	9/1986	Mehrotra et al. ....	371/40.1
4,688,219	8/1987	Takemae ..... ..	371/10.3
4,757,474	7/1988	Fukushi et al. ....	365/189

4,796,233	1/1989	Awaya et al. ....	371/10.2
4,920,518	4/1990	Nakamura et al. ....	371/10.2
4,949,309	8/1990	Rao ..... ..	365/218

Primary Examiner—Robert W. Beausoliel, Jr.

Assistant Examiner—Ly V. Hua

Attorney, Agent, or Firm—Majestic, Parsons, Siebert & Hsue

## [57] ABSTRACT

A system of Flash EEPROM memory chips with controlling circuits serves as non-volatile memory such as that provided by magnetic disk drives. Improvements include selective multiple sector erase, in which any combinations of Flash sectors may be erased together. Selective sectors among the selected combination may also be de-selected during the erase operation. Another improvement is the ability to remap and replace defective cells with substitute cells. The remapping is performed automatically as soon as a defective cell is detected. When the number of defects in a Flash sector becomes large, the whole sector is remapped. Yet another improvement is the use of a write cache to reduce the number of writes to the Flash EEPROM memory, thereby minimizing the stress to the device from undergoing too many write/erase cycling.

4 Claims, 5 Drawing Sheets

